



ULTRAFILTER
THE FILTRATION MANUFACTURER

Kronsbein ultrafilter®



Heat Regenerated Adsorption Dryer HRE

Product description

The externally heat regenerated adsorption dryers of type HRE work according to the dynamic adsorption principle. Wet compressed air streams through a desiccant bed. While streaming through, moisture is drawn out of the compressed air. Since the adsorption capacity of the desiccant is limited, the flow direction has to be changed before the desiccant is completely saturated. Using two parallel adsorption vessels (adsorbers) with alternating function, the permanent supply of consumers with dried compressed air is guaranteed.

One adsorber is always available for drying the compressed air. The second adsorber is regenerated at the same time. The activation time respectively the regeneration time is always shorter than the loading time of the working adsorber.

The regeneration of the saturated desiccant is realized in two steps:

1. Desorption in counter current flow to the adsorption direction with externally heated blower air

2. Cooling of the heated desiccant with a partial stream of dried compressed air.

- A complete type series - with extraordinary design and equipment - guarantees high reliability and very economic operation at the same time.
- Innovative variations allow customized solutions.



Adsorption dryer HRE

1. Process - Characteristics	
	• Desorption in counterflow to the adsorption direction
	• Cooling with an expanded portion of compressed air
	• Designed for automatic and continuous operation

2. Standard Conditions	
Pressure dewpoint:	-40°C
Operation pressure:	7 bar (g)
Inlet temperature:	+35°C
Inlet humidity:	saturated
Average cooling air consumption:	ca. 2% related to V _{nom}

Selection at different operating conditions by correction factor C1 according to table 2..

3. Operating Limits	
Media:	compressed air/nitrogen
Operating pressure:	4-10 bar (g)
Inlet temperature:	5-40°C
Ambient temperature:	5-40°C
max. blower inlet:	35°C/45% to 30°C/60%
Installation:	indoor

Design for operating conditions beyond specified application limits on request.

4. Standard Design	
Control	
• Design:	acc. to VDE/IEC
• Power supply:	3 Ph / 400 V - 50 Hz
• Control voltage:	24 V DC / 230 V - 50 Hz
• PLC:	Siemens S7-200 incl. CPU 224
• Text display:	Siemens TD 200
• Protection:	IP 55 , according to IEC 529
• Control panel:	C-steel sheet, powder coated, RAL7035
• Potential free common alarm contact:	incl..
• Main switch:	incl..
Adsorption Vessel	
• Material:	carbon steel
• Design data:	11 bar (g), 230°C for 0400 - 2500
	10 bar (g), 200°C for 3000 - 9500 according AD-2000
• Design, manufacturing and testing:	according AD-2000
• Approval:	according PED 27/23/EC
• Desiccant:	incl.
• gas distributor:	incl.. (stainless steel)
Piping	
• Nominal pressure:	PN 16
• Material:	carbon steel
• Design, manufacturing and testing:	according AD-2000
• Approval:	according PED 27/23/EC
Options	
Heat insulation	heater to regeneration inlet valves
Electrical flange heater	with overheat protection
Regeneration blower	with suction filter
Pneumatically operated butterfly valves	internals made of stainless steel
Non-return valves	with PTFE- gaskets
Pressure release valves	with silencers
Pressure equalization valves	incl..
Resistance thermometer	Pt 100 - measuring and control devices
Pressure transmitter	for pressure and changeover control
Manometer with shut-off valve	per adsorption vessel
Control air unit	incl. valve manifold with multipole connection and control air filter
Pneumatic box	to house the control air unit (sizes 3500 and up)
End position monitoring	of inlet butterfly valves with limit switches (sizes 3500 and up)
Control air piping	up to size 3000 with PVC-pipe; with galvanized steel pipe (sizes 3500 and up)

5. Standard Options (upon request)
• Dewpoint dependent control ,ultraeconomy
• Mounting of prefilter system incl. piping
• Mounting of afterfilter system incl. piping
• System bypass with 3 manual valves
• Bus interface
• Desorption air heating with steam heater instead of electrical heater
• Desorption air heating with steam and electrical heater
• Heat insulation of adsorption vessel
• 16 bar version
• Status information by light indicators
• Control air piping made of stainless steel
• Changeover monitoring and limit switches for additional butterfly valves
• Monitoring of dryer inlet temperature
• Free of silicone / separating agents
• Alternative power supply
• Pressure dew point below -40°C
• Frost protection down to -20°C
• Outdoor installation
• Special noise reduction

6. Filter
Please select the necessary prefilter and afterfilter systems from our comprehensive filter product range.

7. Condensate
For necessary and economical draining as well as conditioning of accumulated condensate, we recommend our condensate technology range of products.

Technical data HRE

Type HRE	Flow Rate ¹⁾ V _{nom} m ³ /h	Connection DIN 2633	Installed Power kW	Dimensions			Weight kg
				Width W mm	Depth D mm	Height H mm	
0400	400	DN 50	8	1750	1030	2260	1200
0700	700	DN 50	11	1800	1150	2310	1400
1000	1000	DN 80	14	1920	1280	2390	1500
1400	1400	DN 80	20	1920	1320	2420	1900
1700	1700	DN 80	23	2120	1450	2480	2300
2000	2000	DN 80	30	2160	1470	2550	2800
2500	2500	DN 100	36	2260	1600	2630	3400
3000	3000	DN 100	42	2320	1740	2630	3600
3500	3500	DN 100	55	2750	1810	2790	4000
4000	4000	DN 150	55	2800	1890	2890	4800
5000	5000	DN 150	70	2910	2010	2870	5600
6000	6000	DN 150	87	3400	2380	2910	6300
7000	7000	DN 150	96	3500	2400	2990	7200
8200	8200	DN 150	118	3600	2500	3100	8000
9500	9500	DN 200	131	3700	2600	3300	9400

V_{nom} in m³/h related to compressor inlet at 20°C and 1 bar(a), an operating pressure of 7 bar(g) and a compressed air inlet temperature of +35°C (saturated).

Conversion factor (C1) for sizing, depending on dryer inlet temperature and operating pressure at a pressure dew point of -40°C:

Guidance for determining the dryer size:

Inlet Flow Rate V_{eff}: 2000 m³/h

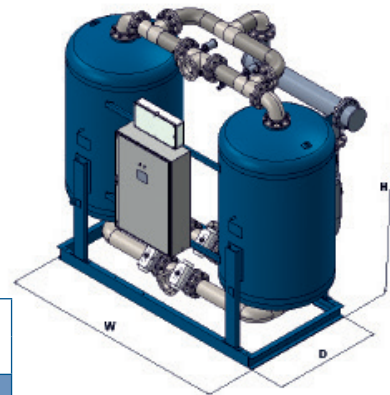
Operating pressure: 8 bar g
0,92

Inlet temperature: 40 °C

Required PDP: -40 °C

$$V_{\text{corr}} = V_{\text{eff}} / K1 = (2000 \text{ m}^3/\text{h}) /$$

$$V_{\text{corr}} = 2173 \text{ m}^3/\text{h}$$



Correction factor K1	Operating Pressure (bar g)							
	4	5	6	7	8	9	10	
Inlet Temp. (°C)	30	0,71	0,86	1,00	1,15	1,18	1,25	1,37
	35	0,62	0,75	0,87	1	1,12	1,25	1,37
	40	0,38	0,53	0,67	0,82	0,92	1,07	1,21
	43	-	0,33*	0,45**	0,54**	0,61***	0,72	0,80

* PDP -20 °C

** PDP -25 °C

*** PDP -30 °C

Technical alterations reserved.



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